

# Heinemann

## Biology 1 Unit 1 - Summary

ALSO refer to Heinemann Student Workbook for:  
Essential knowledge summary.

### UNIT 1

#### Area of Study 1 – Cells in action

On completion of this unit the student should have an understanding of cellular structure, organization and processes; be able to design, conduct and report on an investigation; and be able to explain the application of associated technologies.

#### CHAPTER 1 – Foundations of biology

##### KEY KNOWLEDGE

- Understanding the scientific method
- Fundamental principles of biology
- Composition of cells – organic and inorganic molecules
- General roles of molecules in the structure and function of cells

##### Scientific Method:

- **Hypothesis:** educated guess/possible explanation.
  - Experimentally supported hypothesis becomes theory/principle.
- Controlled experiment: only change one experimental variable.
- **Independent variable:** the one the experimenter changes.
- **Dependent variable:** the one the experimenter measures.
- Controlled variables: the rest - the experimenter keeps constant.
- Limitation: must have a testable hypothesis.
- Should be objective (without bias) not subjective (personal bias).

##### QUESTIONS 1-4 p.9

##### Principles in Biology:

- Organisms are living (not dead): Eat, respond, reproduce, grow.
- Cell theory:
  - All organisms are made up of cells.
  - All cells come from pre-existing cells.

- The cell is the smallest living organisational units.
- All cells have: Plasma membrane, Cytoplasm, DNA.
- Evolution explains the diversity of organisms and organisms are adapted to their environment.
- Organisms are composed of Organic and Inorganic molecules.
  - **Inorganic molecules:** Water, Oxygen, CO<sub>2</sub>, N<sub>2</sub>, Minerals.
  - **Organic molecules:** Carbohydrates (eg. glucose, starch), Lipids (fats), Proteins (eg. enzymes), Nucleic Acids (eg. DNA), Vitamins.

QUESTIONS 5-8 p.13, QUESTIONS 9-11 p.17  
CHAPTER REVIEW Q1-10 p.18

## CHAPTER 2 – The structure of cells

### KEY KNOWLEDGE

- The cell theory
- Structure of prokaryote and eukaryote cells
- Microscopic techniques for investigating cells
- Synchrotron light and biology

### Cell Structure

Cell theory:

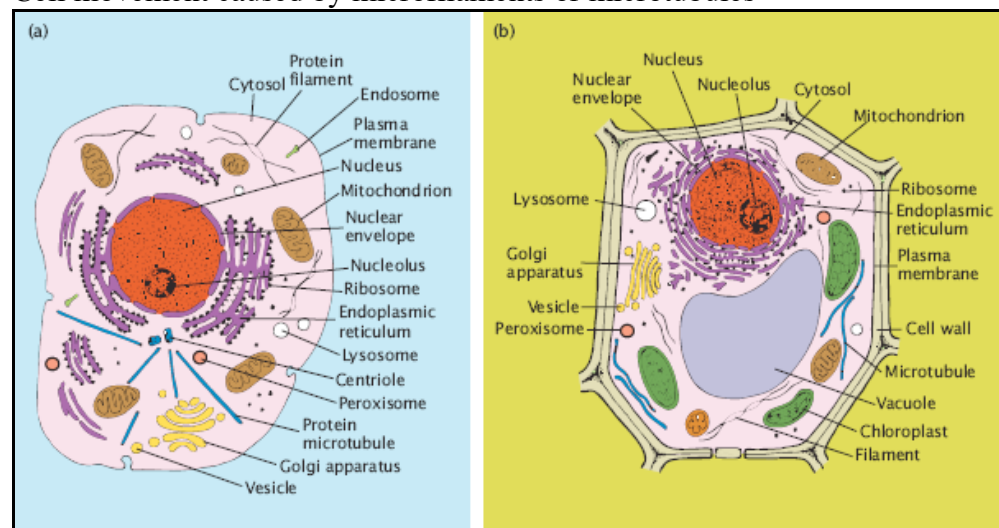
- All organisms are made up of cells.
- All cells come from pre-existing cells.
- The cell is the smallest living organisational units.

Cells are the basic functional unit of living things. All (most) cells have some common features – plasma membrane, cytoplasm, DNA.

Two types of cells, **Prokaryotes** (primitive nucleus) & **Eukaryotes** (true nucleus).

- Prokaryotes: Monera.
  - No obvious structural organization, circular DNA chromosome.
- Eukaryotes: Protista, Fungi, Animalia, Plantae.
  - Contain organelles, DNA in nucleus – linear chromosomes.

Cell movement caused by microfilaments or microtubules



Animal Cell

Plant Cell

**Organelles:** Centrioles, Chloroplasts, Cytoplasm, Cytosol, Endoplasmic reticulum, Golgi apparatus, Lysosomes, Mitochondria, Nucleus, Plasma membrane, Plastids (Chloroplast is one type), Ribosomes, Tonoplast, Vacuole, Vesicles.

QUESTIONS 1-2 p.21, QUESTIONS 4,5,7,8 p.29

### Microscopy

- Light microscopy – um to mm, can use live specimens.
- Electron microscopy – nm to um, specimen must be dead.
- Synchrotron – intense light generated useful in structural biology.

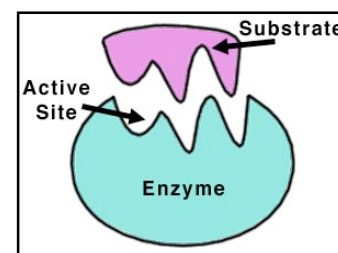
QUESTIONS 9-10 p.34

CHAPTER REVIEW Q1-7 p.35

## CHAPTER 3 – Cells at work

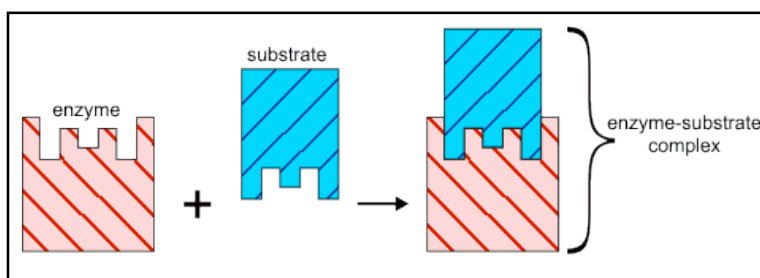
### KEY KNOWLEDGE

- The role of enzymes in cells
- Cellular respiration – releasing energy for work
- Glycolysis, aerobic respiration and fermentation
- Trapping energy by photosynthesis
- Functions of various cell organelles



### Enzymes (organic protein catalysts)

- Help chemical reactions to occur in organisms in particular they speed up the rate of reaction.
- Enzymes bind to substrates at the active site.
- Enzymes are not changed or used up in reactions they merely help it take place.
- They are specific to a particular reaction – like a key is specific to a particular lock.
- Enzymes are affected by temperature – bit of heat = good, too much heat = denature bad.

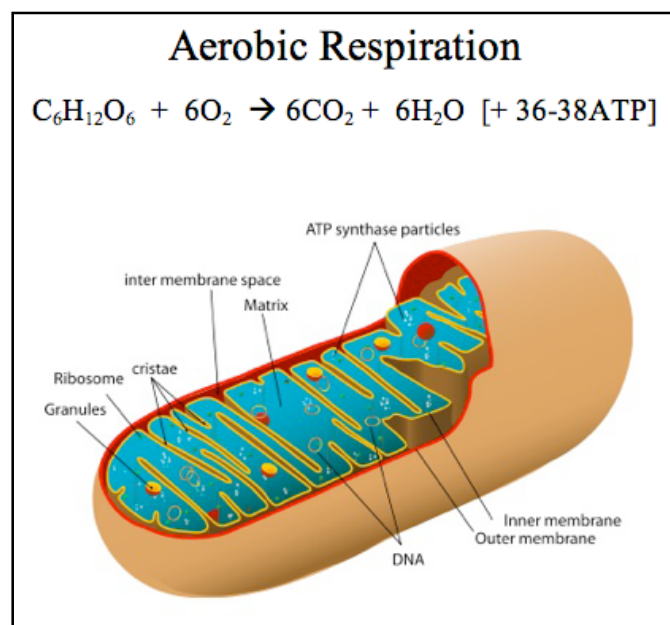


QUESTIONS 1-6 p.40

### Cellular respiration

Occurs in **mitochondria**. Cells use chemical energy to carry out activities. Chemical energy is stored in molecular bonds.

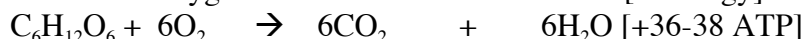
Cells store immediately useable energy in the molecule **ATP** (adenosine triphosphate)



when ATP breaks down to ADP it releases energy for the cell to use.

Cells recycle ADP back into ATP via cellular respiration:

Glucose + Oxygen → Carbon Dioxide + Water [+ Energy]



**Aerobic** (with oxygen) and **Anaerobic** (without oxygen) respiration both begin with glycolysis – the splitting of glucose which produces 2 molecules of ATP.

In aerobic respiration glucose is further broken down to form an extra 34-36 ATP molecules.

In anaerobic respiration the glucose ferments (to lactic acid in animals or ethanol and CO<sub>2</sub> in plants) and no more ATP is produced.

QUESTIONS 7-9 p.41, QUESTIONS 10-11 p.44

### Photosynthesis

Occurs in chloroplasts which contain chlorophyll (traps light)

Carbon Dioxide + Water [+ Light energy] → Glucose + Oxygen + Water



Sometimes summarized as:  $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$

QUESTIONS 12,14 p.46

### Making and handling organic molecules in organelles

- Nucleus – Contains the instructions for the cell in chromosomes made of DNA. DNA transcribed to RNA which leaves the nucleus.
- Ribosomes – RNA goes to ribosomes where it is translated into proteins.
- Endoplasmic reticulum – can be rough (associated with ribosomes) or smooth (lacking ribosomes) involved in synthesis of molecules other than proteins.
- Golgi apparatus – Modify proteins and create vesicles (membrane bound organelles) which carry materials out of the cell in a process called exocytosis.
- Lysosomes – Breakdown waste and carry it away in vesicles.
- Vacuoles – found in plant cells and store sap and provide structural support.

Note that the abundance of organelles in a cell depends on the particular cell function!

QUESTIONS 16-21 p.51

CHAPTER REVIEW Q1-9 p.53

## CHAPTER 4 – Cells membranes and environments

### KEY KNOWLEDGE

- The environment of cells – internal and external
- Cell membranes – plasma and non-plasma
- Surface area to volume relationships
- Transport across membranes – diffusion, osmosis, active transport
- Moving macromolecules – endocytosis, exocytosis
- Communication between cells

### The environments of cells

Cells are all surrounded by **extracellular fluid**.

For unicellular organisms the extracellular fluid is whatever is in the external environment.

For cells of multicellular organisms the extracellular fluid is the organisms internal environment and therefore able to be regulated. A mammal's internal environment is very controlled so that cells can function optimally. Plants internal environment unregulated.

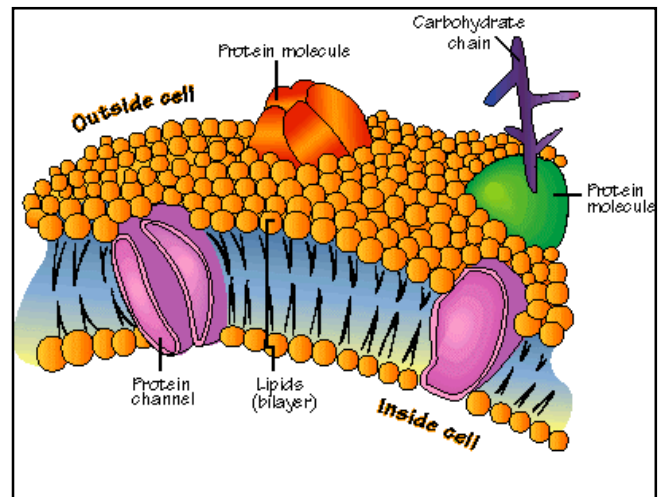
### QUESTIONS 1-3 p.56

#### Cell membranes

Eukaryotes have plasma membranes which surround the cell AND non-plasma membranes which enclose organelles.

Prokaryotes only have plasma membranes as they have no organelles.

Membranes are composed of **phospholipid** molecules which have a hydrophilic and hydrophobic end and therefore form a **bilayer**. Proteins in the bilayer provide channels for the movement of certain molecules. Cholesterol gives stability.



### QUESTIONS 4,5,7 p.60

#### Exchanging with the environment

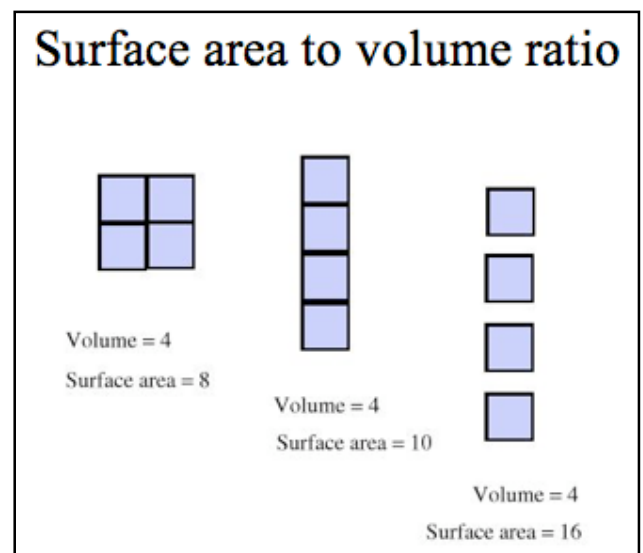
**Surface area to volume ratio** – higher means more surface in contact with the environment. Organisms have adapted larger surface to volume organs (Lungs, Leaves).

### QUESTIONS 8-9 p.62

#### Movement across membranes

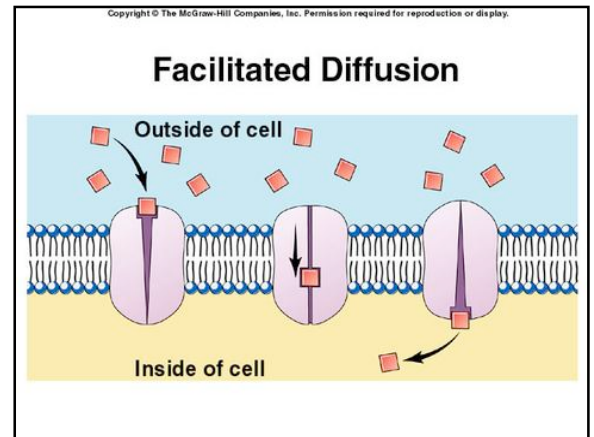
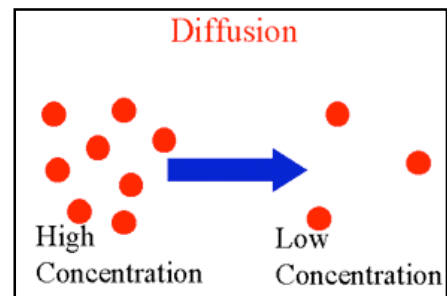
Many molecules go in or out of cells via the plasma membrane:

- Lipid-soluble (dissolve in fat) substances (alcohol): easily pass through
- Very small molecules ( $H_2O$ ): easily pass through
- Small uncharged molecules ( $O_2$ ,  $CO_2$ ): Can pass through
- Larger water-soluble substances (sugar, amino acids): Pass through protein channels (like gates).

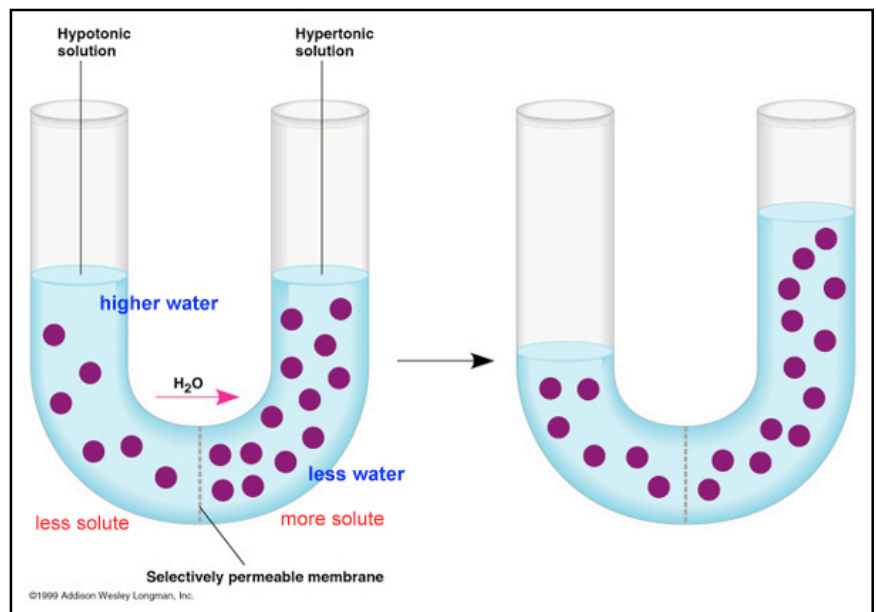


Movement can occur via:

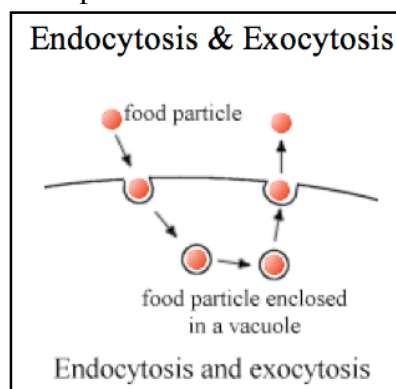
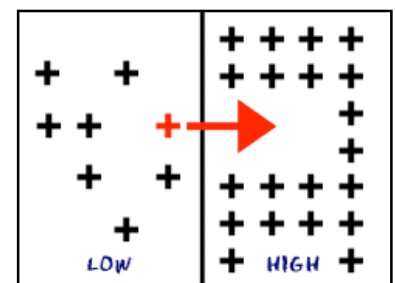
- **Diffusion:** Occurs when solute (thing dissolved in liquid) randomly spreads throughout a solvent (the liquid) until the concentration is even. Solute molecules move from an area of high concentration to low concentration. The difference in concentrations is called a concentration gradient – the larger the concentration gradient the faster the diffusion.
- Diffusion can occur across membranes when the solute can pass through it and can be sped up by '**Facilitated Diffusion**' using membrane bound proteins.



- **Osmosis:** Similar to diffusion, but in osmosis the free water molecules move, not the solute. Water moves from low concentration solute solution to high concentration solute solution along the 'osmotic gradient' via 'osmotic pressure'.



- **Active transport:** requires energy to be expended and occurs via membrane proteins when substances are required quickly or against the concentration gradient.
- **Endocytosis** (into cell) and **Exocytosis** (out of cell): Transport vesicles fuse with the plasma membrane to consume (pinocytosis & phagocytosis) or excrete substances.



QUESTIONS 10-13 p.67



### Communication between cells:

- Intercellular connections: Similar cells are held together by fibrous tissue
- Cell-cell interactions: Cells release chemicals which specifically recognise proteins and carbohydrates on the plasma membranes of other cells.
- Distant communication: occurs when cells release chemicals (hormones) that only interact with cells which have the appropriate receptor molecules.

QUESTIONS 14-15 p.69

CHAPTER REVIEW Q1-11 p.71

## CHAPTER 5 – Cells replication

### KEY KNOWLEDGE

- Cell replication; eukaryotes and prokaryotes
- The purpose of cell replication
- The cell cycle: interphase, mitosis and cytokinesis
- Cell growth, specialisation and death
- The role of stem cells

### All cells arise from other cells

Eukaryotic body tissue cells (and prokaryotes) replicate via a process of **Mitosis** and then **cytokinesis**. The exception in eukaryotic organisms is the formation of gametes which occurs via Meiosis and then cytokinesis.

Purpose of cell replication:

- Growth and development
- Maintenance and repair

QUESTIONS 1-3 p.74

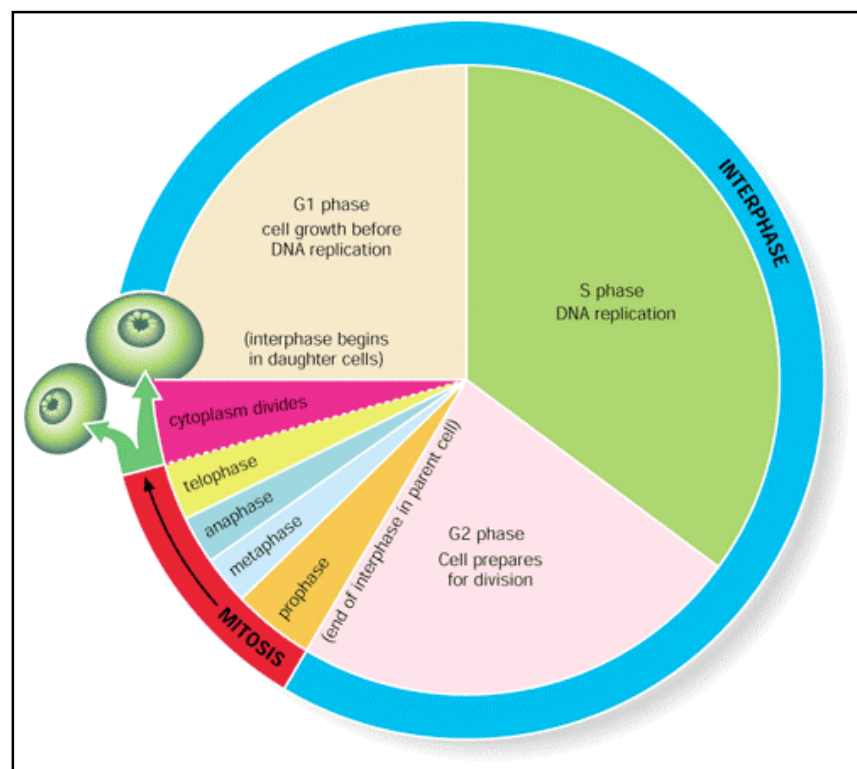
### The cell cycle

Interphase: pre-synthesis (G1), DNA synthesis, post-synthesis (G2). Cellular activity.

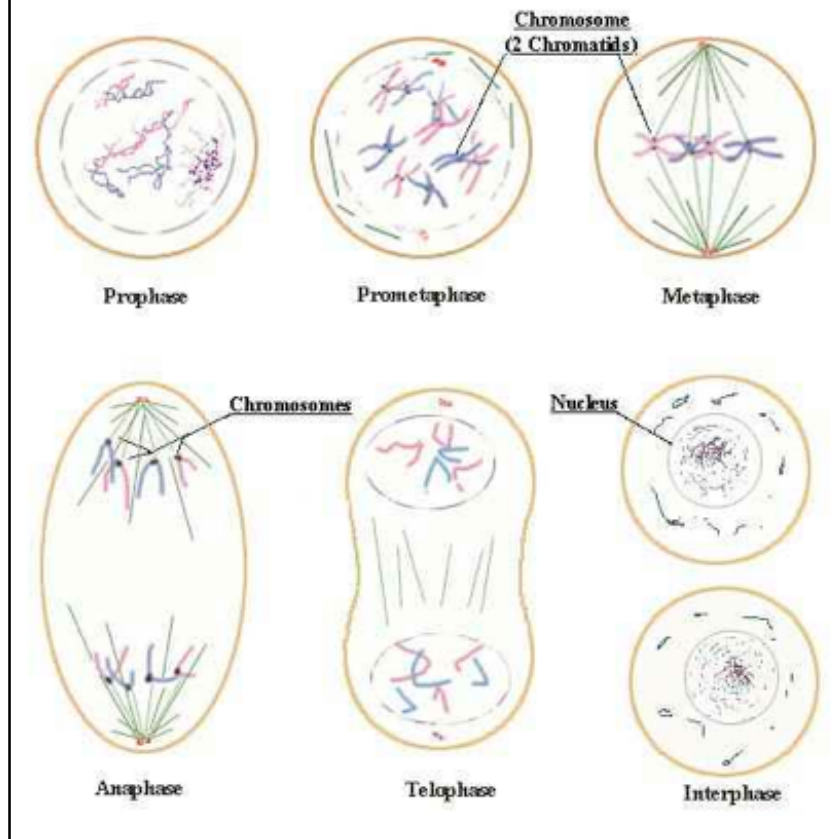
Mitosis: division of the nucleus to replicate one cell into two identical cells.

- **Prophase:** chromosomes condense, nuclear membrane breaks
- **Metaphase:** centromeres attach to spindle fibres and move to the centre
- **Anaphase:** spindle fibres contract separating the chromatids
- **Telophase:** chromosomes move to poles, nuclear membrane forms

**Cytokinesis:** Towards the end of mitosis the plasma membrane pinches the two new daughter cells apart.



# Mitosis



QUESTIONS 4,5,7 p.79

## Cell growth, specialisation and death

As a new organism grows the cluster of unspecialised cells (**stem cells**) begin to become specialised for a particular function and distinct organs and tissues form. New cells are always being replicated and old cells are always dying via **apoptosis**. If the DNA of a cell is mutated such that it doesn't proceed to apoptosis cancer can result.

QUESTIONS 9-10,13,14 p.85  
CHAPTER REVIEW Q1-9 p.86



# UNIT 1

## Area of Study 2 – Functioning organisms

On completion of this unit the student should be able to describe and explain the relationship between features and requirements of functioning organisms, and how these are used by taxonomists to classify organisms. The features of organisms are used as a basis for the classification and taxonomy of organisms.

### CHAPTER 6 – Autotrophs are producers

#### KEY KNOWLEDGE

- Common requirements of living things
- Organic and inorganic nutrients
- Different strategies of autotrophs and heterotrophs
- Autotrophs trap energy: bacteria trap nitrogen
- Features of photosynthetic organisms
- Nutrition in plants

#### Requirements of living things

Energy, Oxygen, Water and Nutrients, Removal of wastes, Reproduction.

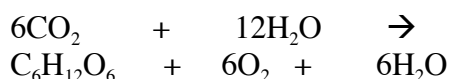
**Autotrophs:** Make their own food and can be photosynthetic or chemosynthetic.

**Heterotrophs:** Obtain food by eating other organisms.

#### QUESTIONS 1-3 p.94

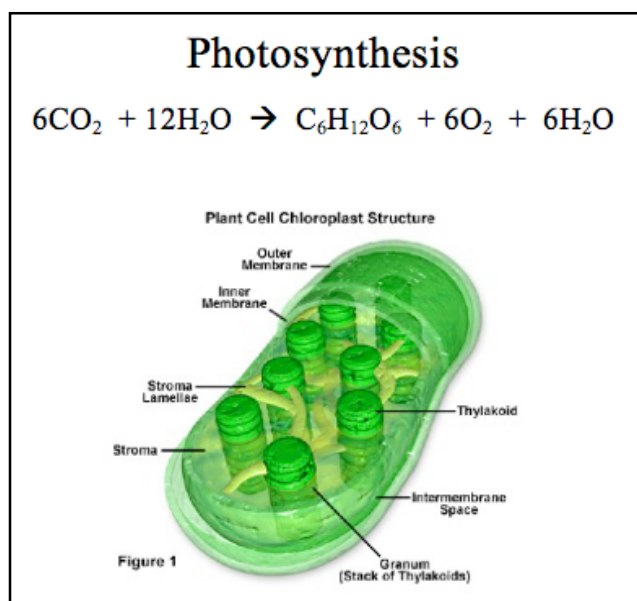
#### Autotrophs produce organic molecules from inorganic molecules

Carbon Dioxide + Water [+ Light energy]  
→ Glucose + Oxygen + Water



Plants also break down glucose to form ATP (cellular respiration) but there is normally a net production of oxygen (after the light compensation point). Plants have adapted structurally to suit their environments they have common features (leaves) but many variations.

#### QUESTIONS 4,6,7 p.100



### **Other nutritional requirements of plants**

Nitrogen: Most organisms can't use the  $N_2$  in the air and rely on nitrogen fixing bacteria.

Mineral salts: Absorbed from the soil via root hairs (which have a high SA:V ratio).

Macronutrients required in large amounts, micronutrients in small amounts.

Nutrient uptake: NOT diffusion but active transport. Water enters via osmosis.

Nutrient storage: Plants store energy (mainly starch but others too) in the bits we eat.

QUESTIONS 8-9,11,12 p.105

CHAPTER REVIEW Q1-12 p.106

## **CHAPTER 7 – Heterotrophs are consumers**

### **KEY KNOWLEDGE**

- Nutritional requirements of heterotrophs
- Obtaining food: effective digestive systems
- Mammalian digestion: herbivores, carnivores and omnivores
- Food storage and energy needs

### **Nutritional requirements**

- Carbohydrates and lipids
- Amino acids: 20 total, 9 essential which cannot be made by an animal.
- Vitamins and minerals: Mammals need 13 vitamins & 20+ minerals.
- Nutritional disease: A variety exist depending on the particular deficiency.

QUESTIONS 1-2 p.111

### **Food digestion**

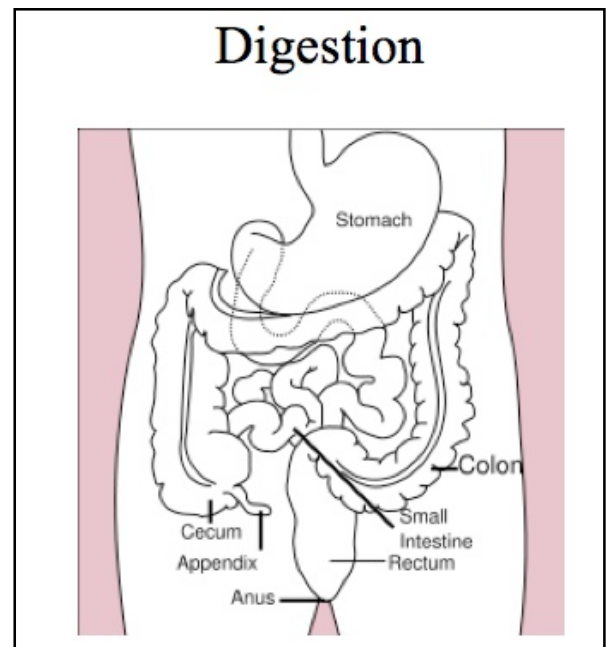
Digestion breaks down large molecules into smaller ones so that they can pass through plasma membranes. Unused passes as egestion (not excretion which is waste removal).

Chemical digestion (enzymes break down large molecules):

- amylases break down carbohydrates
- proteases break down proteins
- lipases break down lipids
- Enzymes operate best at certain pH ranges.
- Most animals rely on extracellular digestion, some invertebrates use intracellular digestion.

Physical digestion is also important especially to increase surface area (eg. Teeth).

QUESTIONS 4-6 p.114



### **Digestive systems**

Different depending on eating pattern, ie. Herbivore, carnivore, omnivore.

#### **Human digestion** – omnivores.

- Teeth grind, saliva lubricates and chemically digests (amylase), oesophagus takes food to stomach via peristalsis.
- Stomach stores food as chyme and chemically digests using HCl (acid – low pH), pepsin and gastric lipase. Mucus protects the stomach wall.
- Small intestine has a large surface area due to villi and microvilli. The first part called the duodenum gets enzymes to finish digestion and bile to neutralise pH. Absorption of nutrients occurs in the duodenum and ileum (2<sup>nd</sup> part of small intestine) mainly via active transport (fats diffuse as they are lipid soluble), water follows via osmosis.
- Large intestine (colon and rectum) no chemical digestion, salt and water absorbed, bacteria digest fibre. Rectum stores faeces.

Herbivores enlist bacteria to digest cellulose in a symbiotic relationship. The enzyme cellulase is required and the breakdown occurs anaerobically by fermentation. Herbivores can be hindgut or foregut fermenters.

QUESTIONS 7,8,10 p.123

### **Energy and food storage in mammals**

Carbohydrates stored in liver and muscles used first, then fat stored in adipose tissue, then protein in body tissues. Amino acids cannot be stored so are needed in diet. Fat is the preferred energy storage vehicle.

An organism's **metabolism** is the total of all the chemical reactions occurring in their body. Basal metabolic rate refers to the amount of energy required to maintain an organism's basic functions.

QUESTIONS 12-14 p.126

CHAPTER REVIEW Q1-12 p.128

## **CHAPTER 8 – Exchanging gases**

### **KEY KNOWLEDGE**

- Diffusion and gas exchange
- Exchanging gases with air or water
- Features of effective gas exchange surfaces
- Systems of gas exchange in animals and plants

### **Exchanging gases with the environment**

It is important for organisms to obtain gases and release gases to survive. Gases move into and out of cells via diffusion.

The amount of diffusion across the plasma membrane depends on the membranes permeability, the available surface area, the thickness of the membrane, and the size of the concentration gradient.

Land organisms have adapted differently to aquatic organisms to suit their environment.

### QUESTIONS 1-3 p.132

#### Gas exchange in animals

Unless organisms are very small with a high surface area to volume ratio special gas exchange organisms are required.

Gills: Little oxygen in water very efficient at getting it, use countercurrent flow. Regulated by oxygen in blood.

Lungs: Lots of oxygen in air less efficient at getting it, site of water loss. Regulated by carbon dioxide in blood.

### QUESTIONS 4-7 p.137

#### Gas exchange in mammals

Air travels down pharynx, trachea, bronchi, bronchioles, alveoli.

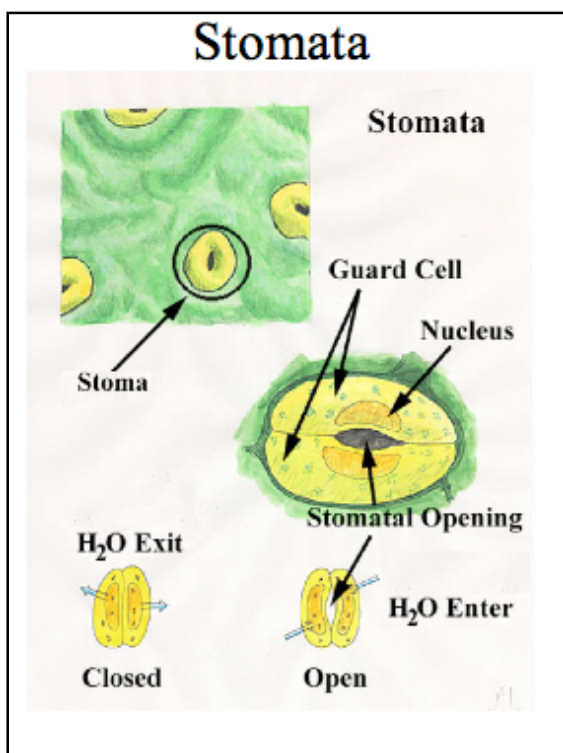
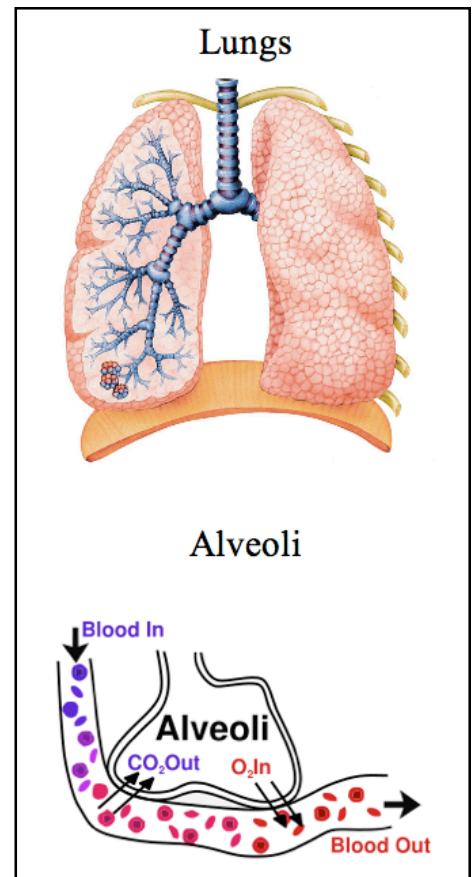
Total lung capacity or vital capacity is less than the tidal volume – the amount we actually breathe.

### QUESTIONS 8-11 p.140

#### Transporting gases

Oxygen is carried around the body in blood by the respiratory pigment haemoglobin. Oxygen also stored in myoglobin in muscles.

Carbon dioxide is carried in plasma, combined with Hb, and as hydrogen carbonate ions.



### QUESTIONS 12-16 p.143

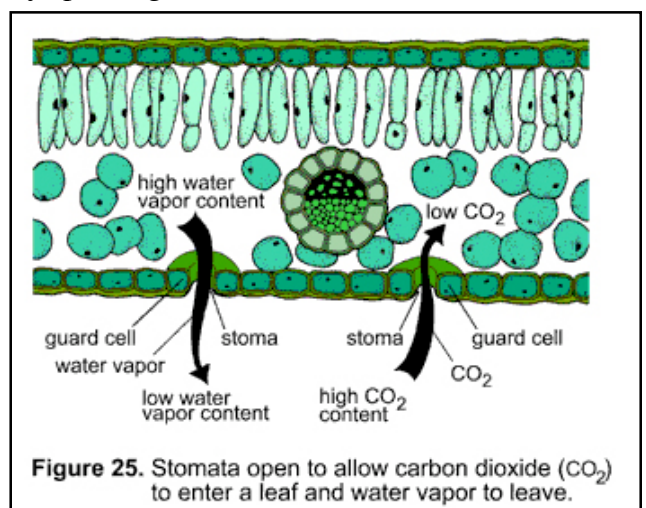
#### Gas exchange in plants

Both Oxygen and Carbon dioxide can be nutrients and wastes depending on the time of day.

Gas exchange occurs through openings called **stomata** which are bordered by special guard cells which control the opening.

### QUESTIONS 17-19 p.147

### CHAPTER REVIEW Q1-10 p.148



**Figure 25.** Stomata open to allow carbon dioxide (CO<sub>2</sub>) to enter a leaf and water vapor to leave.



# CHAPTER 9 – Distributing materials

## KEY KNOWLEDGE

- Functions of internal transport systems
- Effective transport systems in animals
- Mammalian circulation
- Transport needs in plants
- Plant vascular pathways

### Internal transport systems

**Open circulatory systems:** Interstitial fluid (extracellular fluid located in spaces between cells) is pumped around. Works slowly.

**Closed circulatory systems:** Circulatory fluid separated from interstitial fluid and can have specialised properties. Works faster.

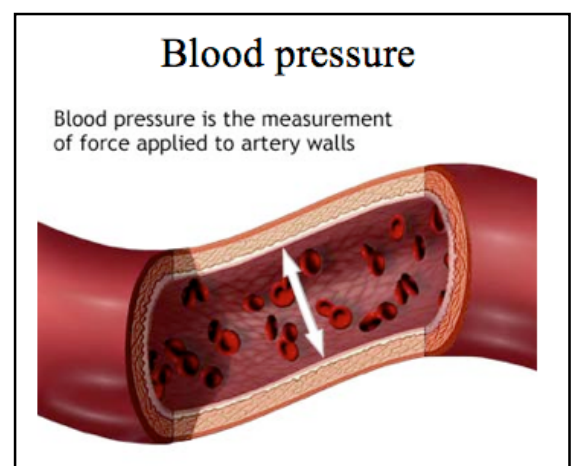
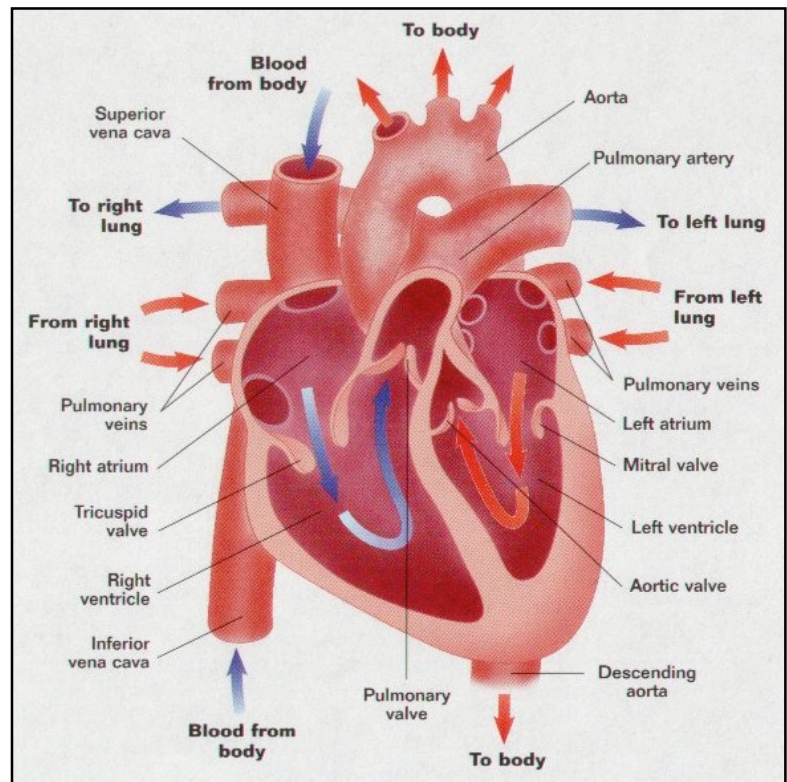
### QUESTIONS 1-5 p.152

### Mammalian transport systems

- **Heart:** Body → Vena Cava → Right atrium → Right ventricle → Pulmonary artery → Lungs → Pulmonary vein → Left atrium → Left ventricle → Aorta → Body.
- **Blood pressure:** High systolic pressure when ventricle contract, low diastolic pressure when it relaxes.
- **Arteries:** Carry blood away from the heart more muscular under greater pressure.
- **Veins:** Carry blood back to the heart less pressure and are more elastic, also have one-way valves.
- **Capillaries:** Provide large surface area for exchange of materials, have very thin walls.
- **Blood:** Red blood cells carry oxygen, White blood cells (phagocytes & lymphocytes) fight disease, platelets clot blood.

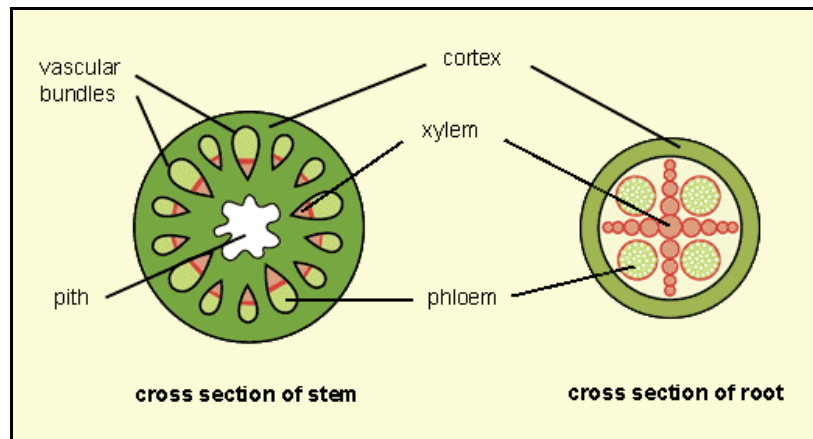
**Lymphatic system:** Open system that returns interstitial fluid to the closed circulatory system using one-way valves.

### QUESTIONS 6-11 p.160



## Transport systems in plants

Vascular tissue:



**Xylem** carries water and inorganic nutrients up the plant from the soil.

- composed of dead cell walls strengthened by lignin
- located in the middle of stems
- movement of nutrients into plant occur by active transport
- movement of water into plant then occurs via osmosis
- movement of liquid up plant is driven by transpiration and capillary action (& root pressure)

**Phloem** transports sugars produced in photosynthesis throughout the plant.

- composed of live cells with perforated ends
- located around the outside of stems
- transport of organic molecules (carbohydrates & amino acids) called translocation

QUESTIONS 12,13,15 p.168

CHAPTER REVIEW Q1-13 p.170

## CHAPTER 10 – Removing wastes

### KEY KNOWLEDGE

- Nature of waste materials produced by animals and plants
- Excretory mechanisms in animals
- The mammalian kidney
- Managing wastes in plants

### Managing wastes materials in animals

Excretion: removal of wastes that were once a part of the organism

Egestion: removal of undigested food

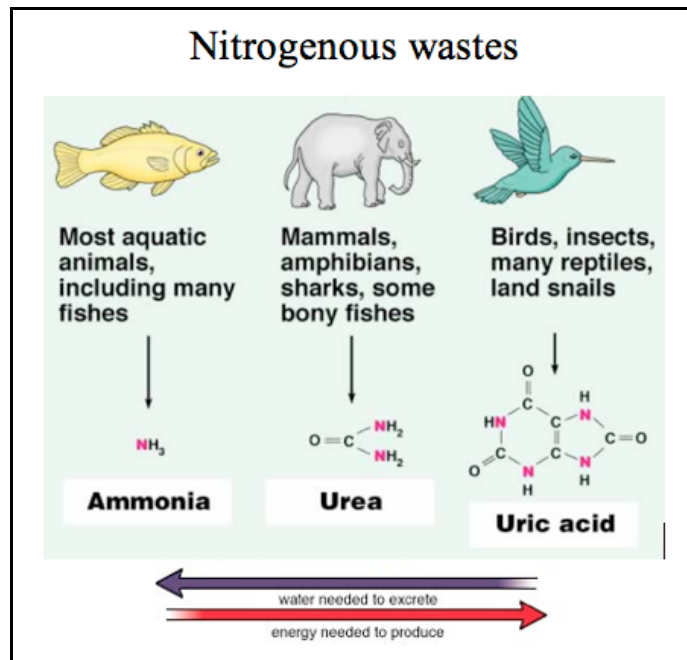
Carbon dioxide: removed across respiratory membranes

**Nitrogenous wastes:** proteins breakdown to ammonia which is toxic.

**Ammonia** excreted or converted to **urea** or **uric acid** which is then excreted.

Different animals excrete different combinations of ammonia, urea, or uric acid.





QUESTIONS 1-5 p.174

### Excretory mechanisms in animals

Animals have specific organs to excrete waste. Eg. Malpighian tubules in insects.

Liver prepares substances for excretion and releases them into blood

Protein → ammonia → urea.

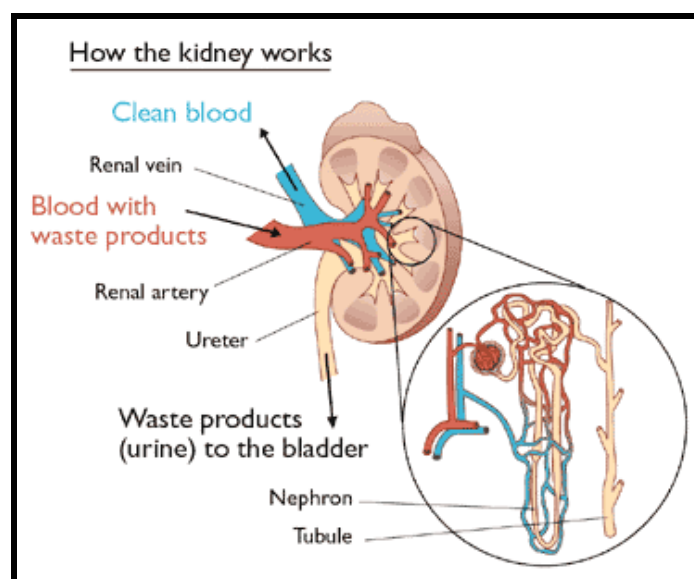
Kidneys filter the blood.

QUESTIONS 6-9 p.177

### The mammalian kidney

The kidney's filter blood to produce urine which drains via the ureter to the bladder.

Useful molecules are reabsorbed back into the bloodstream in the kidney's via active transport – why the kidney's need so much energy.



QUESTIONS 10-12 p.179

### Managing waste materials in plants

Plants do not have specialised excretory organs

QUESTIONS 13-15 p.182

CHAPTER REVIEW Q1-13 p.183

## CHAPTER 11 – Ways of reproducing

### KEY KNOWLEDGE

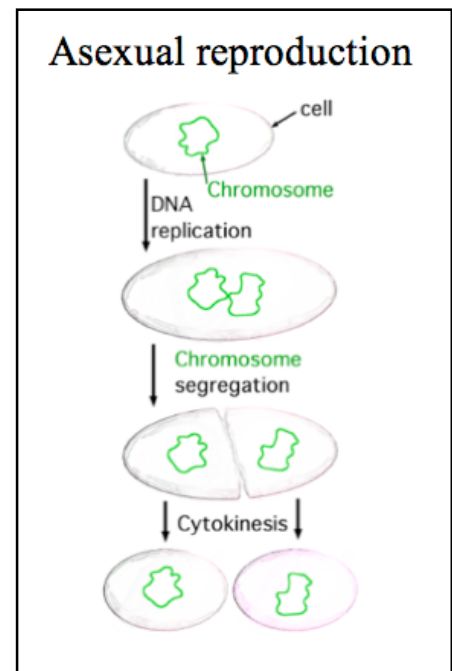
- Asexual and sexual reproduction – advantages and disadvantages
- The process of meiosis
- Reproduction in unicellular organisms
- Sexual reproduction in mammals and flowering plants

### Asexual reproduction

Don't need to find mate. Offspring formed via mitosis – clones of parent.

### Methods of asexual reproduction

- Fission (equal cytoplasm split) & Budding (unequal cytoplasm split)
- Fragmentation: Multi-cellular organism breaks in two.
- Spore formation
- Vegetative reproduction (new plant from parent plant – budding)
- Parthenogenesis: Virgin birth – unfertilised egg forms new organism



QUESTIONS 1-5 p.188

### Sexual Reproduction

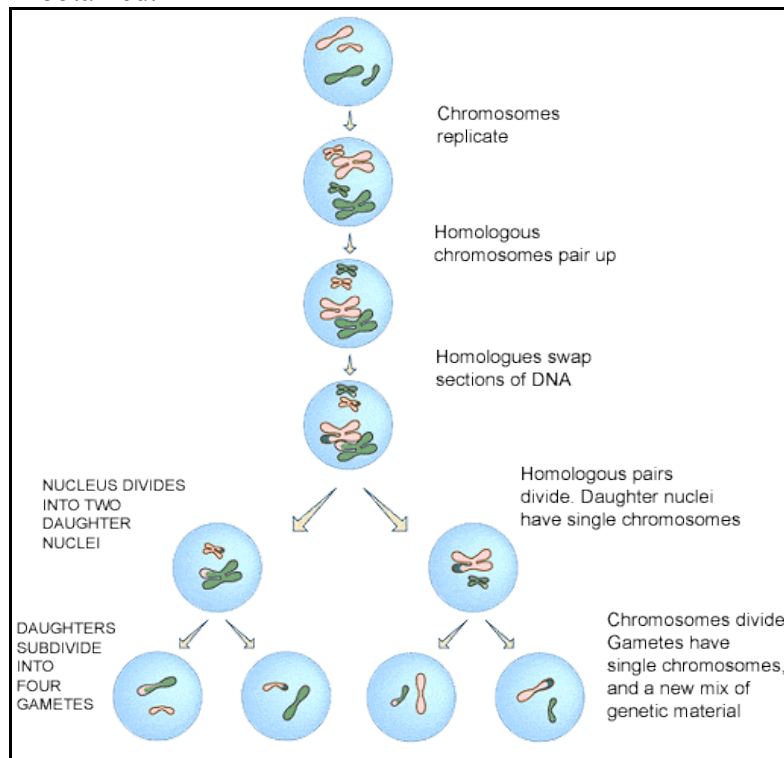
Need a mate. Gametes (n) formed from germ cells (2n).

### Meiosis

Parents with 2 sets of chromosomes (2n) form gametes via meiosis which only have 1 set of chromosomes (n). When the parents mate gametes fuse to form a new organism with 2 sets of chromosomes again (2n).

- Interphase: Before meiosis begins, genetic material is duplicated.
- First division of meiosis
  - Prophase 1: Duplicated chromatin condenses. Each chromosome consists of two, closely associated sister chromatids. Crossing-over can occur during the latter part of this stage.
  - Metaphase 1: Homologous chromosomes align at the equatorial plate.
  - Anaphase 1: Homologous pairs separate with sister chromatids remaining together.

- Telophase 1: Two daughter cells are formed with each daughter containing only one chromosome of the homologous pair.
- Second division of meiosis: Gamete formation
  - Prophase 2: DNA does not replicate.
  - Metaphase 2: Chromosomes align at the equatorial plate.
  - Anaphase 2: Centromeres divide and sister chromatids migrate separately to each pole.
  - Telophase 2: Cell division is complete. Four haploid daughter cells are obtained.

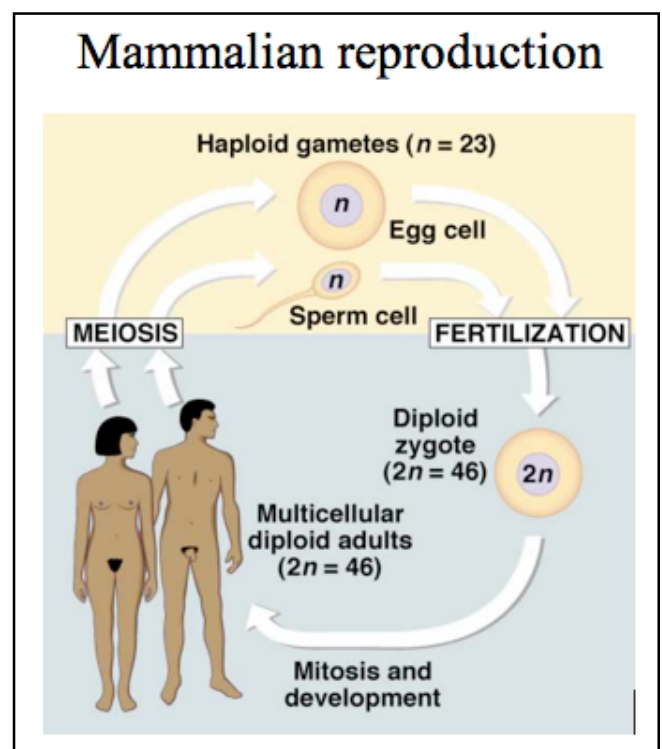


## QUESTIONS 6-7 p.192

### Stages in mammalian reproduction

- Gamete formation (meiosis).
- Male reproductive system: primary sex organ testes (sperm).
- Female reproductive system: primary sex organ ovaries (egg/oocyte).
- Fertilisation: gametes fuse to form zygote.
- Implantation: blastocyst/embryo adheres to uterus.
- Formation of body plan: Ectoderm (outside skin), Mesoderm (middle tissue), Endoderm (inside gut).
- Further development

## QUESTIONS 9-13 p.198



### Aspects of human reproduction

All controlled by a variety of hormones.

Birth and lactation.

Early growth – born helpless.

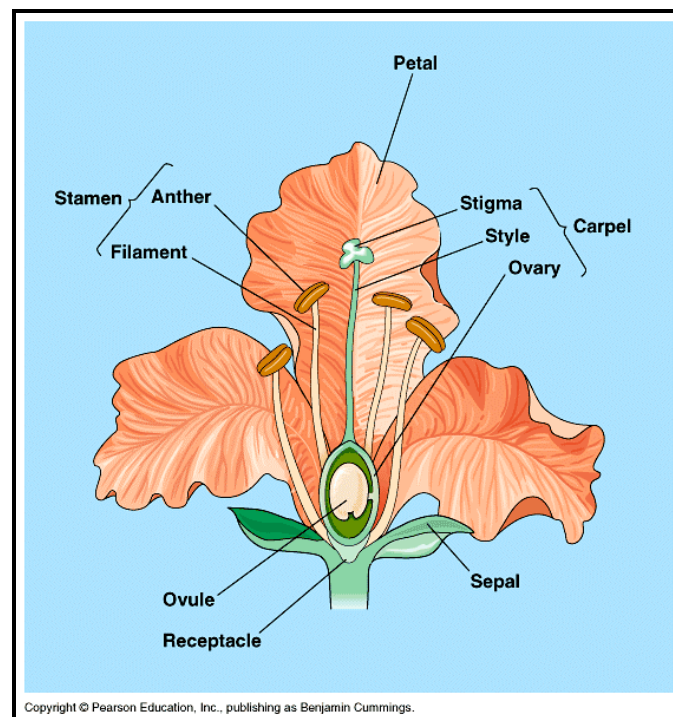
(Oestrus/heat) & the Menstrual cycle.

### QUESTIONS 14-17 p.203

### Sexual reproduction in flowering plants

Flowers are the sex organs of plants.

- The male part is the stamen: made of filament and anther.
- The female part is the pistil: made of stigma, style, and ovary.
- Male pollen grains fertilise the egg in the ovule.
- After fertilisation the ovule becomes a seed and the ovary becomes fruit.
- Seed germinates when the right conditions are met.
- Plant then grows.



### QUESTIONS 18-24 p.209

### CHAPTER REVIEW Q1-15 p.210

## CHAPTER 12 – Classifying Organisms

### KEY KNOWLEDGE

- Organisms that are related to one another are classified into taxonomic groups.

- A taxonomic system helps people communicate information and helps in the identification of organisms
- Taxonomic groups are recognised by their structures and observable features
- The taxonomic system is subject to change and updating as new species and new features are discovered

### Why classify organisms?

Record the world's biodiversity.

Identify harmful (& beneficial) organisms.

### Classification

Placing organisms into groups based on shared qualities.

Phylogeny – how organisms are related to one another through evolution.

Taxonomy is the system of giving names to groups of animals:

GROUPING	MNEMONIC
Kingdom	Kooky
Phylum	Professors
Class	Can
Order	Offer
Family	Funny
Genus	Great
Species	Science

The smallest grouping, species, rarely interbreed if they do they form a hybrid organism. Organisms are named according to the Binomial system of nomenclature (two part names). They often also have a common name.

QUESTIONS 1,3 p.218

QUESTIONS 4-7 p.224

### The major groups of organisms

#### □ KINGDOMS:

Monera, Protista, Plantae, Fungi, Animalia.

#### □ DOMAINS:

Bacteria, Archae, Eukarya.

QUESTIONS 9-10,12 p.229

### Identification of organisms

Look at the features and use a Dichotomous Key.

Eg.

QUESTIONS 15 p.234

CHAPTER REVIEW Q1-15 p.235

